



0061918

Geotechnical Laboratory  
PO Box 4339  
1570 Bear Creek Road  
Oak Ridge TN 37830  
865/482-6497

## CERTIFICATE OF ANALYSIS

Stephen Trent  
Fluor Hanford, Inc.  
825 Jadwin Avenue  
Richland, Washington 99352

January 20, 2004

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	Eberline - Hanford
Shaw Project Number:	100846.05000000
Client Sampling Authorization Form No.	F03-020
Client Sample Data Group:	H2489
Date Received by Lab:	January 9, 2004
Number of Samples:	One (1)
Sample Type:	Soil



### I. Introduction/Case Narrative

One soil sample was received by the Shaw Geotechnical Laboratory on January 9, 2004. The samples was submitted for determination of particle-size distribution and moisture content. The sample number received was B183P0.

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; and Appendix C, Chain-of-Custody/Sample Receipt Records.

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Reviewed and Approved:

Ralph Cole  
Laboratory Manager, Geotechnical Services

RECEIVED  
JUN 21 2004

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## II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, *Laboratory Soils Testing*, appendix II, 1970; United States Environmental Protection Agency, SW846, *Test Methods for Examining Solid Waste, Physical/Chemical Methods*, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, *Soil and Rock (I)*, and Volume 04.09, *Soil and Rock (II)*, 2003. Shaw Environmental and infrastructure, Standard Operating Procedures.

Particle-Size Distribution of Soils ..... **ASTM D 422**  
Moisture Content of Soil and Rock..... **ASTM D 2216**

## III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results - raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.
- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.
- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.
- Routine instrument calibration - instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.
- Maintenance of all past calibration records - calibration records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.

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- Certified and trained personnel - all technicians are certified by the National Institute for Certification of Engineering Technicians (NICET) in geotechnical soil testing, and are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by Shaw.
- Quantitative analyses frequently used in geotechnical/physical testing programs do not use QC tools common to wet chemistry or radiochemistry laboratories. Measures not employed in the analysis of samples reported in this report include: laboratory control samples (LCS), blanks, matrix spikes (MS), duplicate analyses, dilutions, digestions, correction factors, surrogate sample analyses, detection limit determinations, control charts, and/or tentatively identified compounds (TICs).

#### IV. Data Qualification

Two moisture content results are reported. One data page reports the moisture content of a sample aliquot submitted for "moisture content" determination. The second moisture result is reported on the grainsize report sheet, and was determined using excess material from the grainsize test specimen.

**Appendix A**  
**Sample Cross-Reference List**

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Page 4 of 14  
January 20, 2004  
Steven Trent  
Fluor Hanford, Inc.  
Shaw Project Name: Eberline Hanford  
Shaw Project No. 100846.05000000  
SAF No. F03-020  
SDG No. H2489

**Shaw Geotechnical  
Laboratory  
Oak Ridge TN  
865/482-6497**

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**SAMPLE NUMBER CROSS-REFERENCE LIST**

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LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
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BC0257 .....	B183P0.....	Soil
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**Appendix B**  
**Sample Test Results**

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## MOISTURE CONTENT

PROJECT NAME

**Eberline - Hanford**

PROJECT NUMBER

**100846.04000000**

IT LAB SAMPLE NO.	CLIENT SAMPLE NO.	MOISTURE, % ASTM D 2216	MOISTURE, % SW846	SOLIDS, % SW846
BC0257	B183P0	2.1	2.1	97.9

ASTM D 2216 results are based on dry sample weight.

SW846 results are based on wet sample weight.

Solids content is determined by subtracting the SW846 moisture (%) from 100.

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**PARTICLE-SIZE ANALYSIS  
 ASTM D 422**

Project Name Eberline - Hanford

Client Sample No. B183P0

Project No. 100846.04000000

Lab Sample No. BC0257

Specific Gravity = 2.65  
 assumed for calculations

Moisture Content = 2.4%  
 based on dry sample weight

**SIEVE ANALYSIS**

C O A R S E	Sieve No.	Diameter mm	Percent Finer
	3"	75.000	100.0%
	1.5"	37.500	100.0%
	0.75"	19.000	100.0%
	0.375"	9.500	100.0%
	#4	4.750	99.9%
	#10	2.000	98.8%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	88.7%
	#40	0.425	56.1%
	#60	0.250	37.0%
	#100	0.149	26.8%
	#140	0.106	22.4%
	#200	0.075	18.8%

**HYDROMETER ANALYSIS**

H Y D R O M E T E R	Diameter mm	Percent Finer
	0.04768	16.1%
	0.03440	13.5%
	0.02222	10.4%
	0.01307	7.8%
	0.00932	6.5%
	0.00666	4.8%
	0.00457	3.5%
	0.00272	2.2%
	0.00138	1.3%

0.1% Gravel

81.1% Sand

18.8% Silt/Clay

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**Appendix C**  
**Chain-of-Custody and Request-for-Analysis Records**

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FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-020-028		Page 1 of 1			
Collector Pope/Hughes/Pfister		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code <i>SN 8440</i> <i>12/10/03</i> <i>8C</i> <i>45 Days</i> <i>15-30 DAYS</i>			
Project Designation 216-B-26 Characterization Sampling - Soil Sampling		Sampling Location C3245 (247.5-250 ft)		SAF No. F03-020		Air Quality <input type="checkbox"/>					
Ice Chest No. <i>GPP-03-001</i>		Field Logbook No. HNF-N-356-1		COA 119142ES10		Method of Shipment Federal Express		<i>DMAB 11/6/04</i>			
Shipped To Shaw Group		Offsite Property No. <i>See PTR</i>		Bill of Lading/Air Bill No. <i>See PTR</i>							
POSSIBLE SAMPLE HAZARDS/REMARKS <i>Bad fu to B18533</i>  Special Handling and/or Storage <i>SDG# H2489</i>				Preservation		None		None			
				Type of Container		Moisture Resistant		Liner			
				No. of Container(s)		1		1			
				Volume		200g		1000g			
SAMPLE ANALYSIS				Moisture Content - D2216		Particle Size (Dry Sieve) - D422					
Sample No.		Matrix *		Sample Date		Sample Time					
B18533		SOIL		12-30-03		0910		X X			
								BC 0257			
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<i>SDG# H2489</i>  <div style="float: right;">           Matrix *            S=Soil            SE=Sediment            SO=Solid            SI=Sludge            W=Water            O=Oil            A=Air            DS=Drum Solids            DL=Drum Liquids            T=Tissue            WI=Wipe            L=Liquid            V=Vegetation            X=Other         </div>			
<i>JSAPe/12/30/03</i>		<i>1100</i>		<i>M0-0261</i>		<i>12/30/03 1100</i>					
<i>M0-0261</i>		<i>1/6/04 0725</i>		<i>M.A. Bucher</i>		<i>1/6/04 0725</i>					
<i>M.A. Bucher</i>		<i>1/6/04 0725</i>		<i>Fed Ex</i>							
<i>Fed ex</i>		<i>1-8-04 1600</i>		<i>SHAW E &amp; I</i>		<i>1/9/04 @ 1040</i>					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
<i>SHAW E &amp; I</i>		<i>1-8-04 1600</i>		<i>Fed Ex</i>							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
LABORATORY SECTION		Received By		Disposal Method		Disposed By		Date/Time			
		<i>SHAW E &amp; I</i>									
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time					

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SDG # H2489  
Eberline Svcs

CHAIN OF CUSTODY

ORD # R4-01-035

01/08/04 12:32:58

WORK ID: SAF# F03-020 SDG H2489

RCVD: 01/08/04 DUE: 01/22/04

KEEP: 01/21/05 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS
01A-S	B183P0	SHAW-LAB	DISPOS E331S E333S

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
<i>Ken CP</i>	1-8-04	SHAW	1-8-04	<i>[Signature]</i>	1/9/04 @ 104

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SID# H2489  
Eberline Svcs

CONTRACT: PO# RSH-SOW-93-0003

PURCHASE ORDER

# R4-01-035-SU-SW

01/08/04 12:32:38

ORDER Eberline Services/Richmond

FROM Analytical Services

2030 Wright Avenue

Richmond, CA 94804-0040

ATTEN Purchasing

PHONE 510-235-2633

INVOICE Eberline Services/Richmond

TO Analytical Services

2030 Wright Avenue

Richmond, CA 94804-0040

ATTEN Purchasing

PHONE 510-235-2633

AUTHORIZED BY *Lyannamofo*

ORDER Shaw Geotechnical Laboratory

TO 1570 Bear Creek Road

Oak Ridge, TN 37830

ATTEN Ralph R. Cole

Please telephone our Sample Control Department immediately if any problems are encountered in the receipt or the analysis of the samples listed below.

This Purchase Order authorizes Shaw to perform all work listed on the enclosed COC. Alterations to work requested can only be made by Eberline Services or the appropriate Hanford client.

PRICE CODE: 80

FRACTION	TEST	DESCRIPTION	UNITS	DUE DATE	COST
01A	E331S	D422 Particle Size-Dry Svc	Please Advise	01/22/04	0.00
	E333S	D2216 Moisture Content	Please Advise	01/22/04	0.00
TOTAL CHARGE NOT TO EXCEED					\$0.00

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SDG # 12489  
Eberline Svcs

PAGE 1

CLIENT: WES\_HANFORD CON: KCJ  
PROJ: WMC\_FLR

WORK SHEET

CAT: ENVMSW

ORD # R4-01-035

RCVD: 01/08/04 DUE: 01/22/04

STAT: TRANSMITTED 01/08/04

01/08/04 12:32:50

DASH	SAMPLE IDENTIFICATION	STORED	DEPT	START	DUE BY	TESTS	FRACTIONS /
01A-S/B183P0		SHAW-LAB	EN	01/08	01/08	DISPOS	
=====							
SU SW 12/13 01/22 E331S E333S							
=====							

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# WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent  
Project: F03-020: F03-020

Group #: WSCF20031719

Sample #	Client ID		CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
Radiochemistry														
W030001228	B18533	GPP	TRENT	12587-46-1	Gross alpha	SOIL	LA-508-421	16.0	pCi/g	1.00	1.1	12/30/03	12/30/03	12/30/03
W030001228	B18533	GPP	TRENT	E.T.C	Alpha error by LC	SOIL	LA-508-421	+- 4.8	pCi/g	1.00	0.0	12/30/03	12/30/03	12/30/03
W030001228	B18533	GPP	TRENT	12587-47-2	Gross beta	SOIL	LA-508-421	91.0	pCi/g	1.00	1.4	12/30/03	12/30/03	12/30/03
W030001228	B18533	GPP	TRENT	E.T.C	Beta error by LC	SOIL	LA-508-421	+- 14	pCi/g	1.00	0.0	12/30/03	12/30/03	12/30/03

*Tu to B183PO & B183N8*

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MDL=Minimum Detection Limit  
RQ=Result Qualifier

DF=Dilution Factor

\* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report WGPP/ver. 1

Ground Water Protection Program

**PARTS AND TOOLS RETURN (PTR) FORM**  
**PROJECT HANFORD, 2355 STEVENS DR., RICHLAND, WA 99352**

Source of Material		Buyer <u>N/A</u> Telephone <u>N/A</u>	PTR No.  12968
MR No. <u>N/A</u>	PO No. <u>N/A</u>		
Rel. No. <u>N/A</u>	Contract No. <u>N/A</u>		
P-Card Log No. <u>N/A</u>	Other <u>N/A</u>		
Date 01/06/03	F.O.B.	Shipment Authorized by: Print Name: <u>M. A. BAECHLER</u>	
			Total Pieces 1

Ship To: EBERLINE SERVICES  
2030 WRIGHT AVENUE  
RICHMOND, CA 94804

Contact: MELISSA MANNION  
 Contact Phone No.: (510) 235-2633  
 RA No.: N/A

For Account Of: FLUOR HANFORD, INC.  
2355 STEVENS DRIVE  
RICHLAND, WA 99352  
ATTN: MIKE BAECHLER, 300, MO-026

Line Item No.	Quantity	U/M	Description (Catalog ID No., Serial No., Gov. Tag No.)	Unit Price	Value
1	1	EA	ENVIRONMENTAL SAMPLES PACKAGED IN POLY COOLER WITH PACKING PEANUTS COOLER # GPP-03-001 SAF # F03-020 AIR BILL # <u>7900 1845 6702</u> 25 LB	N/A	N/A

REASON FOR SHIPMENT: (Check one)

- ☐ Credit - Return for Credit (Money Only) - Qty Receipt Required
- ☐ Replace - Return for Replacement and/or Repair - Qty Receipt Required
- ☐ Inventory - Return to PHMC Inventory
- ☐ Over - Return Over Shipment (No Receipt/Not a Credit)

MISCELLANEOUS:

- ☐ Credit - Contract/P-Card/Non-Passport PO
- ☐ Core Charge - Return for Credit of Deposit
- ☐ Repair
- ☐ Ship Supplier Owned Materials, Containers, Samples, etc.
- ☐ Ship Waste/Material for Disposal
- ☒ \*Ship Govt. Owned Materials, Containers, Samples, etc.
- ☐ OTHER \_\_\_\_\_

\*Requires identification of controlling Purchase Order, Contract, or PHMC Property Custodian accountable for the Govt. property in accordance with Regulations.

Hazardous Material: <input type="checkbox"/> Yes* <input checked="" type="checkbox"/> No	*T&P Inspection (req'd): <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Certified Free of Contamination: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Radioactive Material: <input type="checkbox"/> Yes* <input checked="" type="checkbox"/> No	Include appropriate shipping document. Radioactive Material is also hazardous.	Certifier's Name/Date
Rad. Control Survey: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

Custodian: <u>M. A. BAECHLER</u>	Current Location: <u>MO-026/300 AREA</u>	Date Available to Ship: <u>00001/6/03</u>
Telephone: <u>531-0638</u>		

Item	% Cost	Cost Center	CACN	COA	Shipping Department	
1	100	M4P00	119142	ES20	Routing <u>FEDEX AIR</u>	By <u>CR NELSON</u>
					B/L No. <u>7900-1845-6702</u>	Date Shipped <u>01/06/2003</u>
					B/L Wt. <u>25 LBS</u>	OSD&D No. _____
					Frt. Collect _____	Shipping Notice No. _____
					Acct. No. _____	Receipt No. _____





**EBERLINE**  
SERVICES

### SAMPLE RECEIPT CHECKLIST

[illegible]

Calibration date \_\_\_\_\_

Calibration date \_\_\_\_\_

Calibration date \_\_\_\_\_